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ABSTRACT

Prospective elementary teachers were surveyed at the conclusion of the course "Methods and Materials for Teaching Elementary School Mathematics" and one semester later at the end of their student teaching experience. The study attempted to determine if the goals and objectives of the course were met and to examine the recommended emphasis for the course based on the prospective teachers' experience and concerns in teaching mathematics to school children. Conclusions include: students' perceptions regarding their own capabilities and preparedness do not change drastically over a short period of time; and the perceptions of students tend to recommend that course emphasis be maintained. (MK)

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PERCEPTION CHANGES OF STUDENTS WHO STUDIED IN A FIELD-CENTERED METHODS COURSE FOR TEACHERS OF ELEMENTARY SCHOOL MATHEMATICS AND UPON COMPLETION OF STUDENT TEACHING: A FOLLOW-UP STUDY

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Perception Changes of Students Who Studied in A Field-Centered Methods Course for Teachers of Elementary School Mathematics and Upon Completion of Student Teaching: A Follow-Up Study.

For a training program to be regenerative based on feedback it must develop a procedure to gather such feedback. All too often when prospective teachers are trained in the teaching of elementary school mathematics that's the end of it. Generalist observe their behavior during student teaching and hardly anyone observes them when they become permanent teachers. Consequently, feedback sources such as that found in a supervised practiccum (as student teaching) tend to be absent after student teaching. However, the important question is not what do others think of the adequacy of a teacher's skills and training but does the teacher feel he or she is indeed equipped to do the job adequately. This paper is an attempt at measuring whether prospective teachers' perceptions of their readiness change as they proceed from a methods course through student teaching and in which direction is the change.

The teacher training program at the University of Houston has as its primary goal: the preparation of teachers who have demonstrated their teaching competence both in the university classroom and in real classrooms where the performance and the consequence of performance is evaluated. Normally, prospective teachers complete four phases (each one semester in length) of professional courses before being granted the degree or is certified to teach in elementary school classrooms. The sequence of these phases is designed to give the prospective teacher both knowledge and experience to bridge the gap between preparation

and teaching professionally. The first phase is designed to introduce prospective teachers to the profession of teaching - exposing them to the reality of the market. The second phase is designed to expose prospective teachers to the foundations necessary for teaching in a school environment. The third phase is designed to give prospective teachers the content methods background for teaching in the elementary school. And the fourth and final phase, is the internship (student teaching) where prospective teachers demonstrate that they can put-it-all-together.

The methods and materials component for training prospective teachers in the teaching of elementary school mathematics is given during the third phase of the prospective teacher's program. During this one semester experience, prospective teachers spend (approximately) the first five weeks on campus learning strategies for teaching elementary school mathematics. Prospective teachers attend lectures that direct their thinking concerning the diagnosis and prescription process for learning. The experience also requires the prospective teacher to personally perform learning tasks using the materials that will be used with school children. The complete experience requires the prospective teacher to attend class, view slide-tapes, read selected readings, and demonstrate teaching materials to the staff and/or their peers.

Around the sixth week of the semester, the prospective teacher goes to a selected elementary school to practice the implementation and make decisions necessary in a diagnostic based mathematics program. The prospective teacher then spends another five weeks attempting to aid learners attain an identified objective. The prospective teacher is evaluated on the degree to which he/she can select, design, and implement learning experiences consistent with the identified goals. Usually, this requires the prospective teacher to demonstrate the ability to sequence learning from concrete experiences to more abstract forms of experience.

The Procedure for this study:

This study is an attempt at a model for gathering feedback

for the regeneration of design components for training prospective teachers in the teaching of elementary school mathematics. There were two parts to the instrument designed to assess concerns. Part I asked the question: WERE THE GOALS AND OBJECTIVES OF THE 433 EXPERIENCE REASONABLY MET? Part II examined the: RECOMMENDED EMPHASIS FOR EED 433 BASED ON THE PROSPECTIVE TEACHERS EXPERIENCE AND CONCERNS IN TEACHING MATHEMATICS TO SCHOOL CHILDREN. There were seventeen items for Part I and thirty-three items for Part II.

It was deemed imperative that anonymity of the prospective teacher be preserved to gain honest assessments. The prospective teacher was identified by a six digit number that was unchangeable and, yet, no one could match the number with individuals without endless search procedures. The first two digits were generated by the prospective teacher's month of birth, the next two digits by the prospective teacher's date of birth, and the last two digits by the last two digits of the prospective teacher's social security number.

The prospective teacher was asked to complete the instrument at the end of the course Teaching Elementary School Mathematics and at the end of his/her student teaching or internship. The first was administered on campus. The second was administered by mail. The on campus administration yielded 160 participants and the mail administration yielded 45 participants. Some contributing factors to this attrition were: prospective teachers who did not student teach during that semester, prospective teachers who moved, and prospective teachers who chose to give verbal feedback not incorporated into the instrument.

The Findings:

The findings for Part I of the instrument yielded data relevant to the question: WERE THE GOALS AND OBJECTIVES OF THE 433 EXPERIENCE REASONABLY MET? Prospective teachers were asked to make marks on an unmarked Likert-type scale, indicating the degree

to which they agreed or disagreed with the statement. Scores ranged from one to five. A T-Test analysis was applied to test the significant differences between the means of the two administrations of the instrument. The SPSS sub-program T-Test was used.

Table I is a listing of all seventeen statements of Part I of the instrument along with the results of the T-Test. Observation One (denoted O_1) was given at the end of the methods course with an "n" of 160. Observation Two (denoted O_2) was given at the end of student teaching with an "n" of 45 (forty-five). Whenever there was homogeneity of variance between the two observations, the t-value is computed based on a pooled variance estimate. Whenever there was significant difference in the variance between the two observations, the t-value is computed based on a separate variance estimate. $P < .05$ was selected as the level for determining significant differences between variance of the observations.

Of the seventeen statements analyzed, only statements three and five were significantly different at the $P < .05$ level. The prospective teacher perceived that they were more confident in their ability to adequately select, design, and use mathematics evaluation materials at the end of student teaching than they were at the end of their methods course. The prospective teacher also perceived that it is not as easy to work with peers on mathematics related teaching concerns as they had thought at the end of the methods course. An examination of the means and t-scores on Table 1 seems to indicate that as prospective teachers moved from methods into teaching their perceptions of their abilities becomes slightly more negative -- but not significantly.

The t-test procedure was used to test the difference between means on Part II of the instrument. The prospective teacher evaluated the emphasis of thirty-three components of the course: Methods and Materials for Teaching Elementary School Mathematics. The scale was 1 = Increase; 2 = Maintain; 3 = Decrease; 4 = Omit; 5 = No Opinion. Table 2 illustrates the significance between the mean at the end of the methods course and the mean

at the end of student teaching.

Only components ten and thirty were significantly different at the $P < .05$ level. The prospective teacher tended to want less emphasis on lesson planning at the end of student teaching than at the end of the methods course. Also, the prospective teacher perceived that rather than increase the use of textbooks as sources as was perceived at the end of methods, that, perhaps, the present emphasis in the methods course should be maintained. The examination of the t-scores and means on Table 2 seems to indicate that there is a trend on the part of prospective teachers to lean in the direction of not recommending increase in course component emphasis but maintain the present emphasis. However, this tendency was not supported statistically.

The scores for each part of the instrument were totaled. Table 3 illustrates the t-test for means when case totals were compared. The mean for the sum of scores on Part II were significantly different at the .05 level. The means for Part I were very similar as were the variance of scores. The scores on Part II appear to reinforce the observation made on the examination of Table 2. The prospective teacher appeared to be recommending that the emphasis of components of the course be maintained.

Conclusions:

This follow-up study was done to examine the change of perceptions of prospective teachers who have completed the course: Methods and Materials for Teaching Elementary School Mathematics. Also, this study was designed to see if the procedures used is a viable one for producing data for evaluation and regenerative purposes in designing course experiences for prospective teachers of elementary school mathematics. After examining the changes between means over a one semester period of time, the perceptions of prospective students regarding their own capabilities and preparedness do not change drastically over a short period of time.

Therefore, it may be safe to examine the degree of preparedness at the end of the course.

After examining the changes between means over a one semester period of time, it appears that the perceptions of prospective teachers tend to lean in the direction of recommending the emphasis in the course as they experienced it be maintained. Therefore, a clearer picture regarding the emphasis of course components may be better assessed after some time has passed and/or experience.

The conclusions stated above are only speculative based on the data used in this study. There is no way to determine whether the prospective teachers who responded were representative of the total population. However, one must accept the hypothesis that the majority of items tested indicated that there appeared to be homogeneity of variance between both administrations of the instrument. With this in mind, it may be wise to conclude that the procedures used were viable and the methods course appears sufficient for the needs of student teaching.

TABLE 1
t-Test for Means - Part I
(203 degrees of freedom indicate pooled variance estimate.)

	Statement	O_1 mean	O_2 mean	t	df	p*
1.	You are confident in your ability to read and understand elementary school mathematics textbooks and curriculum guides.	1.94	1.80	.85	94	.40
2.	You are confident in your ability to select mathematics teaching materials.	1.89	1.93	-.23	203	.82
3.	You are confident in your ability to adequately select, design, and use mathematics evaluation materials.	2.28	1.89	2.16	99	.03**
4.	You are confident that elementary school mathematics can be learned by most children.	1.41	1.60	-1.50	203	.14
5.	You find it easy to work with peers on mathematics related teaching concerns.	1.53	1.87	-2.03	203	.04**
6.	You do not dread the thought of teaching mathematics at <u>any</u> level of the elementary school.	2.25	2.18	.30	203	.77
7.	You are confident that all elementary school mathematics ideas can be understood by you.	2.01	2.02	-.09	99	.93
8.	You have a reasonable working knowledge of where to go for mathematics ideas and resources.	2.09	1.96	.72	93	.47
9.	You are convinced that it is of utmost importance to make math concepts and symbols "meaningful" before practice and drill begins.	1.36	1.53	-1.34	203	.18

*p = probability ** = significant at $p < .05$

TABLE 1 (Continued)

Statement	O_1 mean	O_2 mean	t	df	p*
10. You are convinced that children should have "meaningful experiences" before and while learning abstract ideas.	1.24	1.33	-.85	203	.40
11. You do not believe that teachers should use any one means (such as one test) to determine learner readiness.	1.36	1.42	-.43	203	.67
12. You don't believe motor (concrete), visual-perceptual (semiconcrete), or verbal (abstract) experiences produce the same kind of learning.	1.98	2.31	-1.55	203	.123
13. You are confident in your attempt to be a successful teacher of elementary school mathematics.	1.73	1.62	.56	203	.57
14. You are confident that you can be "retrained" or "up-dated" with little effort in the teaching of elementary school mathematics.	1.61	1.69	-.47	203	.64
15. You are open to "new" and "better" ways to be a more successful mathematics teacher.	1.18	1.31	-1.10	61	.28
16. Your experience in the University of Houston mathematics methods course was beneficial to your career.	2.68	2.64	-.13	203	.90
17. Your experience in the University of Houston's mathematics methods course had a significant positive effect on how you teach mathematics.	2.68	2.69	-.03	203	.98

*p = probability ** = significant at the $p < .05$

TABLE 2
t-Test for Means - Part II
(203 degrees of freedom indicate pooled variance estimate.)

	Component	O_1 mean	O_2 mean	t	df	p*
1.	diagnosing learner readiness	1.38	1.64	-1.66	55	.10
2.	making games	1.59	1.62	-.29	203	.77
3.	days in the schools	2.13	2.07	.39	203	.69
4.	constructing tests	1.71	1.62	.65	203	.52
5.	"concrete" (motor-hands-on) ideas for teaching.	1.49	1.51	-.23	203	.82
6.	"semiconcrete" (visual-perceptual) ideas for teaching.	1.56	1.47	.85	203	.40
7.	abstract approaches to teaching	1.58	1.73	-1.41	203	.16
8.	"real world application ideas for teaching	1.39	1.42	-.28	203	.78
9.	How to begin a mathematics lesson.	1.24	1.42	-1.74	203	.08
10.	How to design math lesson plans.	1.31	1.69	-2.50	56	.02**
11.	Helping you understand the math you are teaching.	1.50	1.64	-1.08	203	.28
12.	preparing and using self-teaching lessons for children	1.41	1.60	-1.09	59	.28
13.	the number of children you worked with	1.81	1.84	-.17	57	.87
14.	teaching problem solving skills	1.44	1.76	-1.86	58	.07
15.	teaching kindergarten	2.44	2.36	.36	203	.72
16.	teaching 1st and 2nd grades	1.88	1.91	-.22	203	.83
17.	teaching 3rd and 4th grades	1.82	1.93	-.67	203	.50

*p = probability ** = significant at p < .05

TABLE 2 (continued)

	Component	O_1 mean	O_2 mean	t	df	p*
18.	teaching 5th and 6th grades	1.84	1.91	-.46	203	.64
19.	teaching the handicapped	1.92	2.11	-.87	203	.39
20.	teaching the academically talented	1.60	1.96	-1.64	59	.11
21.	teaching the special problem child (below average)	1.48	1.73	-1.25	57	.22
22.	increase your understanding of how math is learned by school children	1.23	1.36	-1.40	203	.16
23.	obtaining inexpensive or free teaching materials	1.18	1.38	-1.33	51	.19
24.	teaching math and other subjects together	1.59	1.62	-.17	203	.87
25.	ways to incorporate individualized learning into a class situation	1.21	1.36	-1.20	58	.23
26.	select activity-centered ideas to motivate students	1.22	1.38	-1.33	58	.19
27.	design activity-centered ideas to motivate students	1.23	1.36	-1.22	203	.23
28.	use activity-centered ideas to motivate students	1.33	1.44	-.82	203	.41
29.	design a topic using elementary school textbooks as a source	1.82	2.29	-1.95	61	.06
30.	teach a topic using elementary school textbooks as a source	1.59	1.96	-2.04	203	.04**
31.	make mathematics more interesting for the teacher	1.50	1.64	-.87	203	.38
32.	use questioning techniques in teaching math	1.52	1.64	-.79	203	.43
33.	how to identify elements in your teaching which need improving	1.18	1.31	-1.36	203	.18

*p = probability ** = significant at p < .05

TABLE 3

t-Test for means when case totals are compared

Totals for	O_1 mean	O_2 mean	O_1 S.D.	O_2 S.D.	t	df	p
Part I	31.05	31.53	10.85	11.14	-.26	203	.79
Part II	49.24	55.69	14.36	15.00	-2.64	203	.01**

** = significant at $p < .05$